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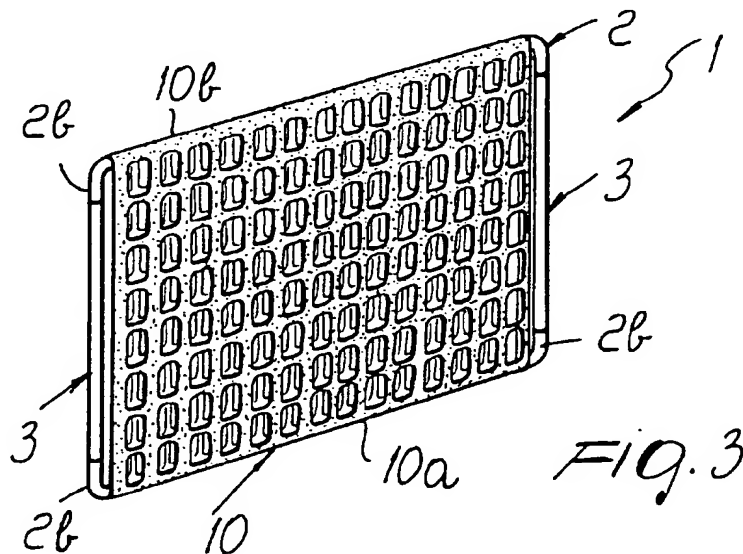
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(54) Barrier for delimiting spaces, indicating paths, pointing out dangers and the like

(57) A barrier for delimiting spaces, indicating paths, pointing out dangers and the like, comprising a tubular frame (1) which has a closed shape and to which a sheet-like element (10) made of extruded plastics and

closed in a loop can be applied, the sheet-like element being anchored to two mutually opposite portions of the frame by shrinkage produced by a thermal treatment.



## Description

The present invention relates to a barrier for delimiting spaces, indicating paths, pointing out dangers and the like.

It is known that barriers for forming partitioning or delimiting elements are already commercially available and are generally formed by means of a tubular metal frame which has a closed shape and acts as a surrounding element, for example, for a plurality of bars which are welded to the frame or for a panel which is screwed to said frame.

Other solutions provide wood trestles or in any case elements which are always difficult to handle and have a considerable weight and bulk, causing serious problems in the transport and storage thereof.

Other enclosure solutions use plastic elements, such as nets and the like, but these solutions are generally flimsy and require supporting elements which must be fixed to the ground and therefore require an installation which is difficult to move.

The aim of the present invention is to solve the above problems, by providing a barrier for delimiting spaces, indicating paths, pointing out dangers and the like which can be obtained by means of modular elements which are very light but have a considerable mechanical strength and can be arranged mutually adjacent so as to obtain any configuration deemed appropriate.

Within the scope of this aim, a particular object of the present invention is to provide a barrier in which it is possible to obtain partitioning elements which are particularly easy to handle and can be easily arranged mutually adjacent during storage without having empty spaces.

Another object of the present invention is to provide a barrier which starting from a basic element allows to obtain a wide range of installations by utilizing suitable completion accessories.

Another object of the present invention is to provide a barrier for delimiting spaces, indicating paths, pointing out dangers and the like which can be easily obtained starting from commonly commercially available elements and materials and is also competitive from a merely economical point of view.

This aim, these objects and others which will become apparent hereinafter are achieved by a barrier for delimiting spaces, indicating paths, pointing out dangers and the like, according to the present invention, characterized in that it comprises a tubular frame which has a closed shape and to which a sheet-like element made of extruded plastics and closed in a loop can be applied, said sheet-like element being anchored to two mutually opposite portions of said frame by shrinkage produced by a thermal treatment.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive

embodiment of a barrier for delimiting spaces, indicating paths, pointing out dangers and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic exploded perspective view of the elements that constitute the tubular frame having a closed shape;

figure 2 is a perspective view of the step for applying the sheet-like element closed in a loop over the tubular frame;

figure 3 is a view of the sheet-like element, rigidly coupled to the tubular frame;

figure 4 is a schematic front view of two mutually hinged barrier elements, one of which is shown with a net, the other element being shown with a continuous layer;

figure 5 is a plan view of two barrier elements, illustrating the possibility to mutually rotate;

figure 6 is a schematic view of the detail of the coupling of a supporting foot between two tubular frames arranged side by side;

figure 7 is a sectional view, taken along the plane VII-VII of figure 6;

figure 8 is a schematic perspective view of the element for the hinged coupling of two tubular frames arranged side by side;

figure 9 is a perspective view of a stake for fixing the barriers to the ground;

figure 10 is a schematic view of a plurality of barriers arranged side by side and fixed to the ground by means of stakes;

figure 11 is a schematic view of an element for stacking barriers;

figure 12 is a schematic view of barriers arranged in a stacked configuration;

figure 13 is a view of the supporting foot;

figure 14 is a view of two barriers arranged side by side with the corresponding supporting feet;

figure 15 is a view of a supporting foot for an inclined barrier;

figure 16 is a schematic view of barriers arranged at an angle;

figure 17 is a perspective view of a wheeled supporting foot;

figure 18 is a perspective view of barriers with a wheeled support.

With reference to the above figures and in particular to figure 1, the barrier for delimiting spaces, indicating paths, pointing out dangers and the like, according to the present invention, comprises a tubular frame, generally designated by the reference numeral 1, which has a closed shape and is advantageously constituted by two transverse elements 2 having a straight portion 2a and a curved end portion 2b; said transverse elements are coupled to posts 3 which have, at their end, insertion-coupling elements 4 which enter the end of the curved

portions 2b of the transverse elements 2.

The tubular frame is thus constituted by tubular portions which can be mutually joined and advantageously has a square or rectangular configuration.

A sheet-like element 10 made of plastics can be applied to the tubular frame 1 having a closed shape; the sheet-like element can be advantageously constituted by an extruded plastic net or optionally by extruded continuous plastic layers.

The sheet-like element can be extruded directly with an annular shape, thus using a portion thereof which is fitted over the frame 1.

In this embodiment, the sheet-like element 10 or tubular net is stretched transversely, obtaining in practice a loop of net which is fitted over the tubular frame 1.

It is optionally possible to use a longitudinally stretched net which is joined at its ends so as to form the loop and be fitted over the tubular frame 1.

Once the sheet-like element 10, closed in a loop because it is formed directly with an annular shape or because it is joined at the end of a segment, has been applied to the frame 1, it is subjected to shrinkage by thermal treatment.

Such shrinkage allows to consolidate the tubular structure 1 constituted by the interlocked elements, as mentioned above.

It has been found experimentally that it is convenient to use a net or sheet-like element 10 which can shrink by a percentage which is at least equal to the stretch ratio applied; thermal treatment is advantageously performed at a temperature above 50°.

It is also possible to extrude a tubular net containing elasticizing additives, so that the resulting loop of net, when heated to a temperature above 50°, undergoes a shrinkage which is equal to at least 2% of the length of the net 10.

Shrinkage by thermal treatment of the net 10 in practice forms a monolithic assembly.

The net 10 is arranged so as to advantageously have continuous portions 10a, i.e., portions not affected by the holes, which lie at the regions for gripping the frame 1.

The extension of the sheet-like element 10 at right angles to the direction in which it is closed in a loop preferably leaves on the outside the tubular portions that are arranged substantially at right angles to the grip portions.

Advantageously, said portions can be constituted by said vertical posts or by vertical posts which are coupled in order to produce the mutual coupling of two tubular frames arranged side by side, with the possibility to rotate with respect to each other.

As clearly shown in figures 5 and 8, it is possible to provide a connecting element 20 constituted by two mutually welded or otherwise coupled posts 21 which end with cylindrical insertion-coupling elements 22 fully identical to the insertion-coupling elements 4 which allow to provide a hinged coupling to the curved end

portions of the transverse elements of the tubular frames 1 arranged side by side.

As shown in figure 6, the connecting portions produce a mutual spacing in which it is possible to insert accessory elements for supporting the frames 1, obtaining both an interlock coupling and the possibility of a mutual rotation of the frames.

Said accessory elements can be constituted by supporting feet 30, as shown in figures 6 and 7, which form base portions 31 from which there extends a post 32 which has a flattened region 33 that allows the interlocking of two frames 1 arranged side by side, thus obtaining an insertion coupling, also by utilizing the taper that affects the vertical portion owing to a gradual flattening.

It is optionally possible to also provide through holes 34 for connecting fixing pins or in any case to connect the supporting feet 30 at their ends.

Again by using the same insertion-coupling principle, it is possible to provide stakes 40 which have, at one end, the flattened region 33 and have, at the other end, a point 41 for penetration.

It is also possible, as shown in figure 11, to provide stacking elements constituted by segments 50 which have, at both ends, the flattened regions 33 that fit inside mutually stacked barriers, utilizing the same interlock principle described above.

As shown in figure 15, it is possible to provide an inclined supporting foot 60 having an inclined portion 61 which again has the flattened regions 33 to provide a coupling which is fully identical to the one described above.

Figure 17 illustrates a supporting element 70 which ends, in a downward region, with a wheel 71 and is provided, in an upward portion, with the flattened regions 33.

From the above description it is thus evident that the present invention achieves the intended aim and objects, and in particular the fact is stressed that a particularly light and handy barrier is provided which allows to provide tubular frames which are mutually pivoted so that they can mutually rotate through 360° and allows to add accessory elements for ground support, for anchoring to the ground, for stacking or in any case for mutually connecting two frames having the same structure.

Moreover, use of a sheet-like element or of a net made of extruded plastics allows to obtain a component which is highly monolithic and solid yet is remarkably lightweight.

It should be added to the above that the net according to the present invention forms a convenient supporting element for signs and the like.

The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may also be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the

contingent shapes and dimensions, may be any according to requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

#### Claims

1. A barrier for delimiting spaces, indicating paths, pointing out dangers and the like, characterized in that it comprises a tubular frame which has a closed shape and to which a sheet-like element made of extruded plastics and closed in a loop can be applied, said sheet-like element being anchored to two mutually opposite portions of said frame by shrinkage produced by a thermal treatment.
2. A barrier according to claim 1, characterized in that said tubular frame is constituted by elements which can be mutually coupled.
3. A barrier according to claim 1, characterized in that said tubular frame has transverse elements with a straight portion which blends with a curved end portion, posts being coupled to said curved end portion, said posts having, at their ends, insertion-coupling elements which can be inserted in said curved end portions.
4. A barrier according to claim 1, characterized in that said sheet-like element has a continuous surface.
5. A barrier according to claim 1, characterized in that said sheet-like element has a substantially net-like configuration.
6. A barrier according to claim 1, characterized in that said sheet-like element is extruded in the shape of a loop and is subjected to transverse stretching.
7. A barrier according to claim 1, characterized in that said sheet-like element is constituted by a longitudinally stretched portion joined at its ends so as to form a loop.
8. A barrier according to claim 1, characterized in that said sheet-like element has a shrinkage due to thermal treatment which is at least equal to the applied stretching ratio.
9. A barrier according to claim 1, characterized in that said sheet-like element is obtained from an extruded component with elasticizing additives for generating shrinkage during thermal treatment.
10. A barrier according to claim 1, characterized in that said shrinkage is equal to at least 2%.
11. A barrier according to claim 1, characterized in that said sheet-like element is subjected to a thermal treatment at a temperature above 50°C.
12. A barrier according to claim 5, characterized in that said sheet-like element in the shape of a net has continuous portions which are not affected by holes of the net and are arranged at a region for coupling to transverse elements of said frame.
13. A barrier according to claim 3, characterized in that said sheet-like element leaves said posts free.
14. A barrier according to claim 2, characterized in that it comprises an element for mutually connecting two frames so as to allow pivoting, said element being constituted by two posts which are mutually joined and arranged side by side and have, at their ends, cylindrical insertion-coupling elements which can be rotatably coupled to the curved portions of the transverse elements that form said frame.
15. A barrier according to claim 14, characterized in that between the posts of two frames arranged side by side accessories are inserted which have a coupling portion constituted by a tubular element provided with a flattened region that can be inserted between the posts of the two frames arranged side by side.
16. A barrier according to claim 15, characterized in that said accessories comprise supporting feet which form base portions from which there extends a post which has a flattened region for the interlocking of mutually opposite frames and has, at a coupling region, a substantially conical expanded portion.
17. A barrier according to claim 16, characterized in that it comprises stakes which form said flattened region at one end and a penetration point at the other end.
18. A barrier according to claim 16, characterized in that said accessories comprise stacking elements constituted by segments which form said flattened regions at both ends.
19. A barrier according to claim 15, characterized in that said accessories have a supporting foot with an inclined portion provided with said flattened region.
20. A barrier according to claim 15, characterized in that said accessories comprise a supporting element provided with a wheel in a downward region.

21. A barrier according to claim 15, characterized in that it comprises through holes at said flattened region for the insertion of fixing pins at the outer posts of frames arranged side by side.

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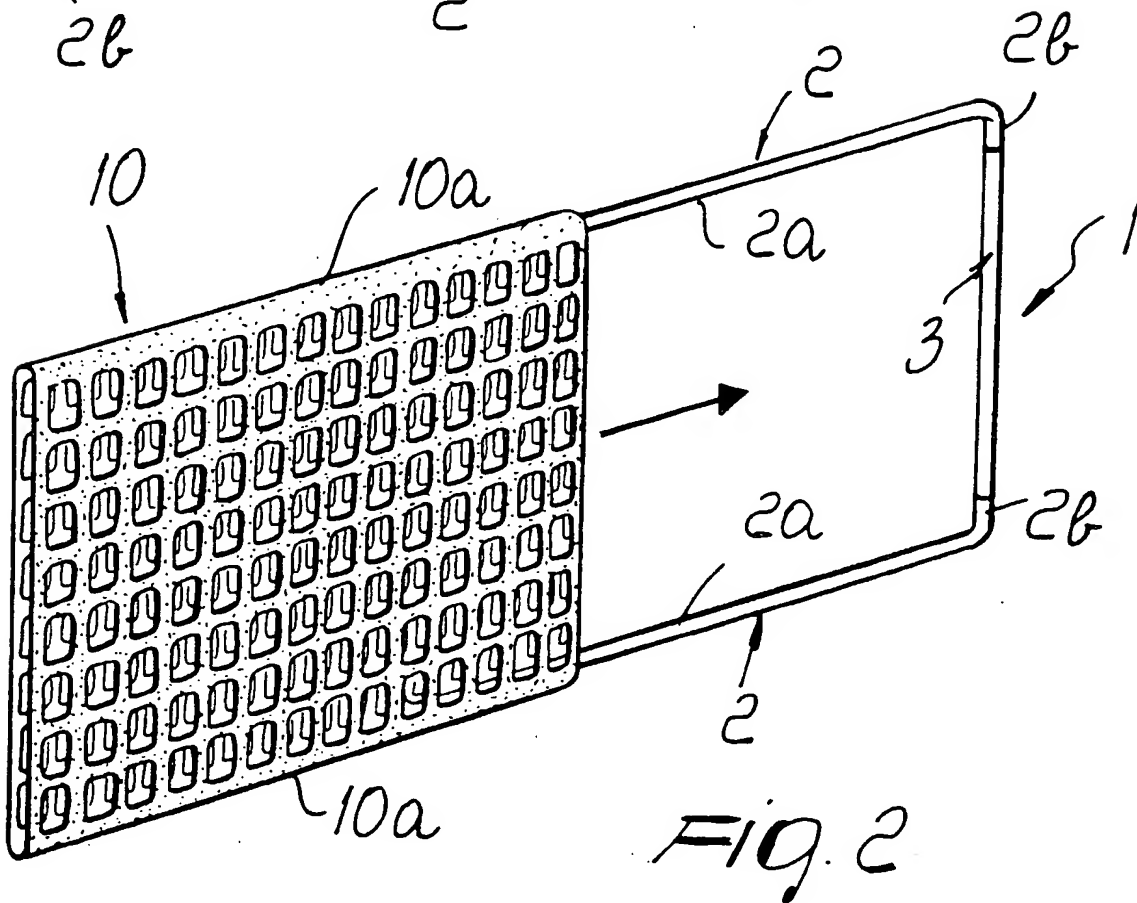
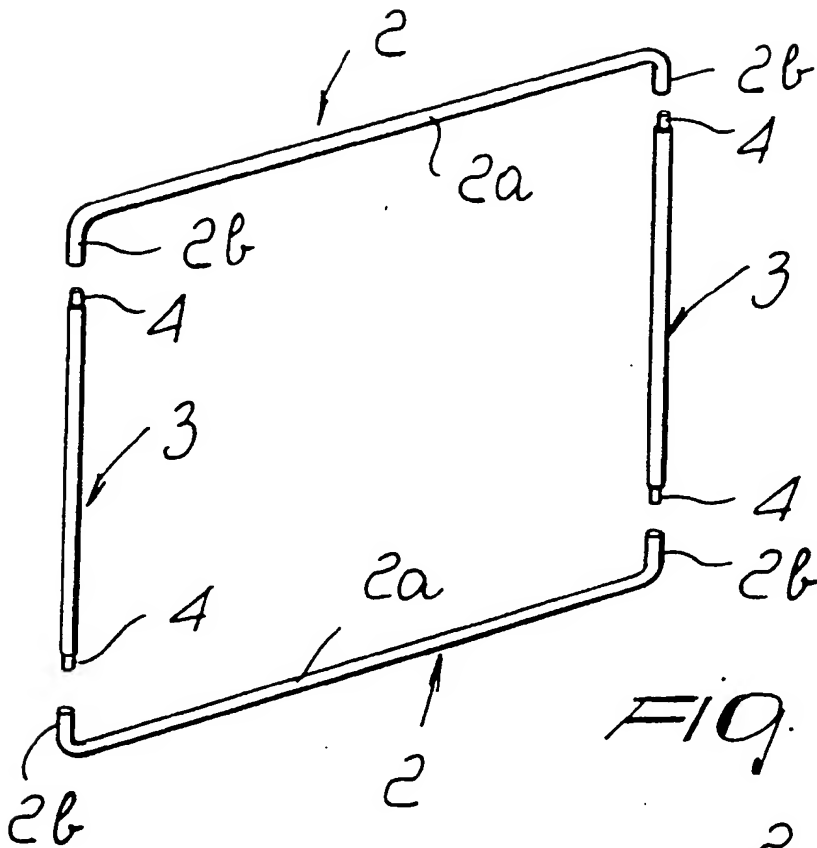
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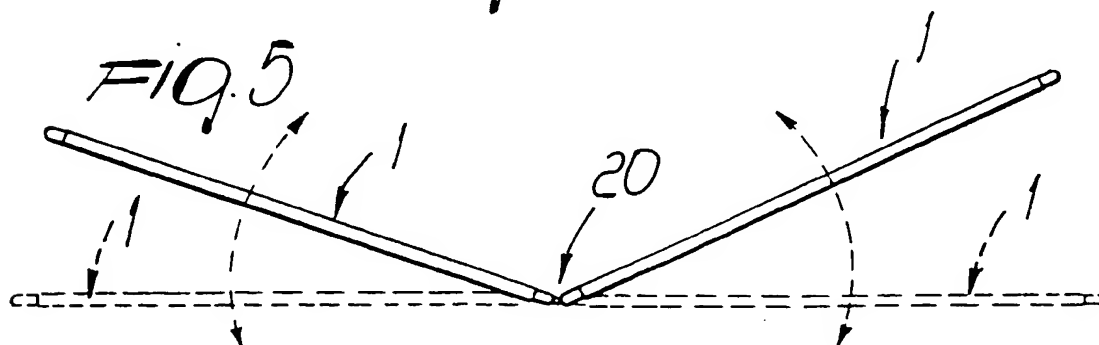
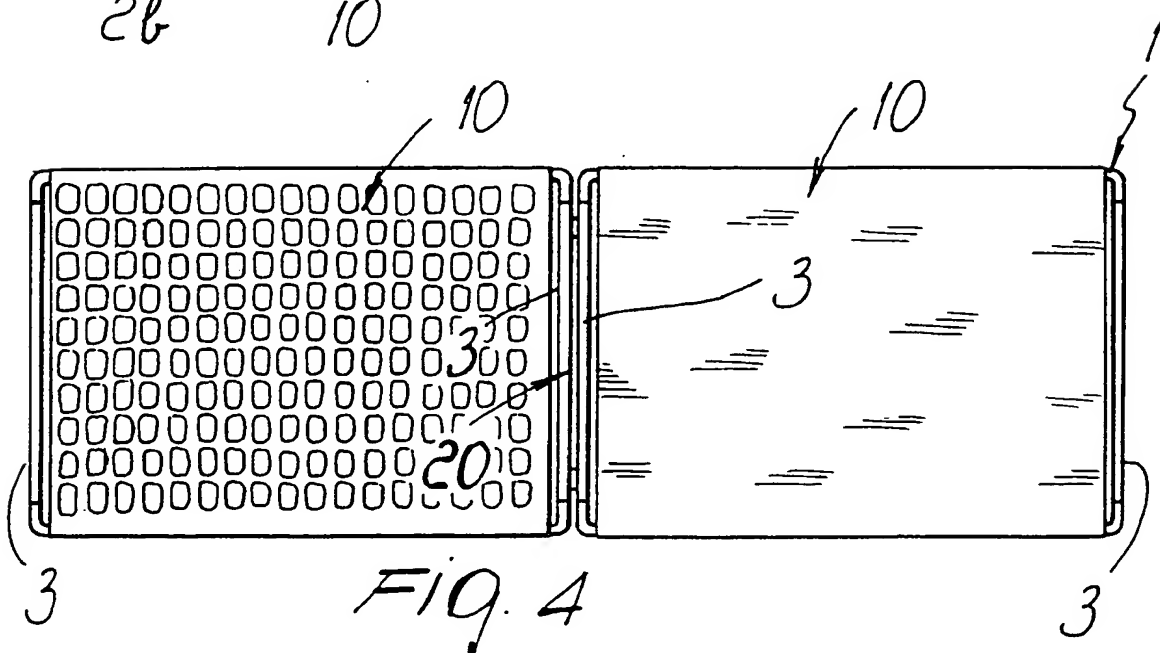
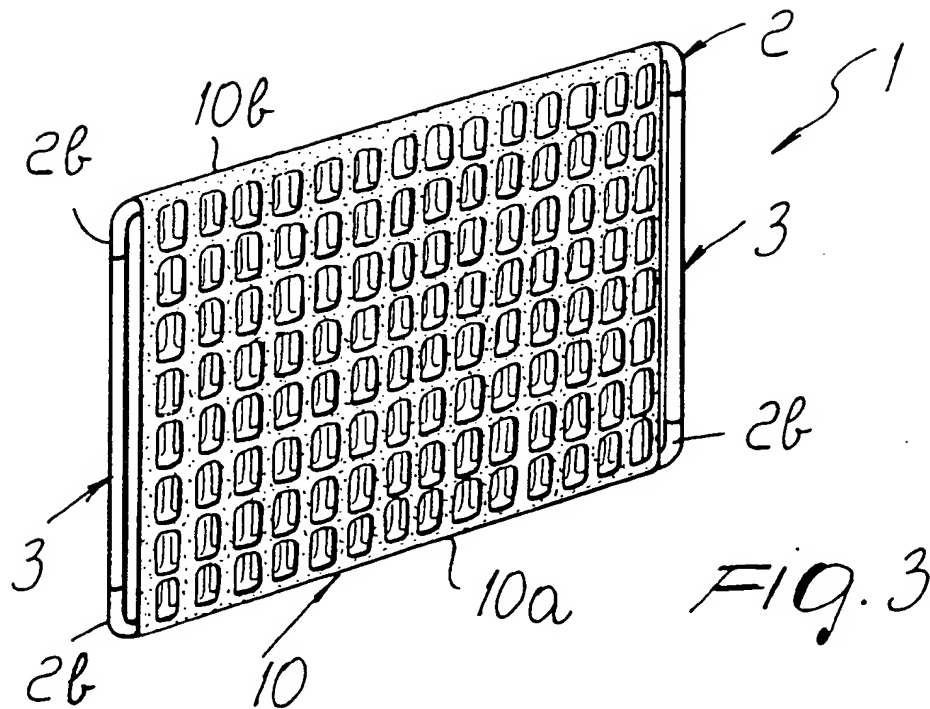
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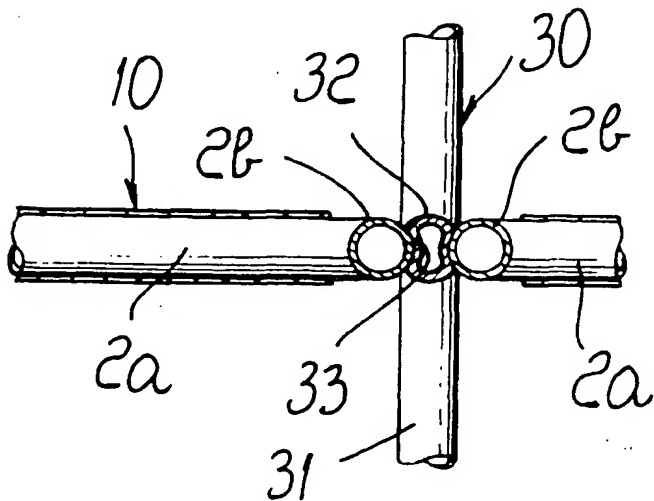
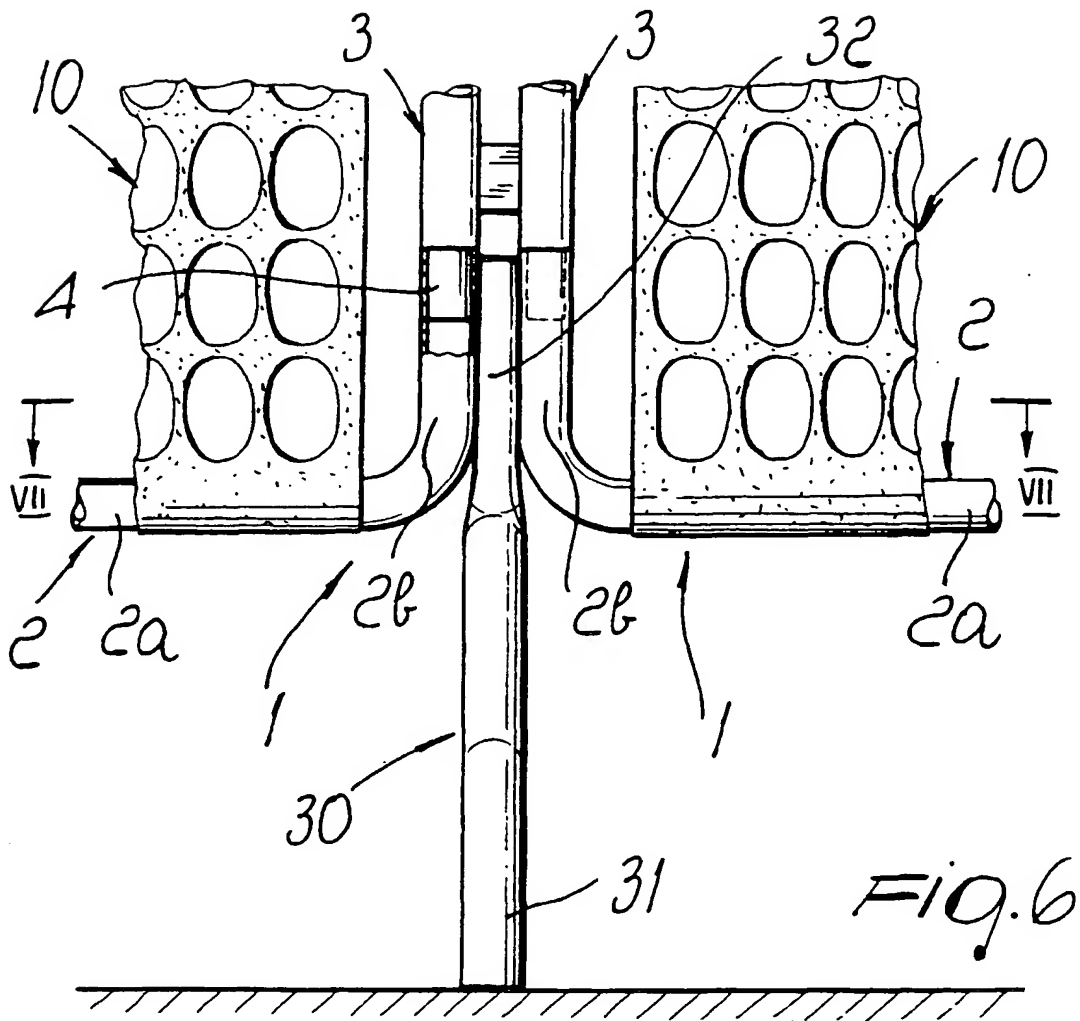
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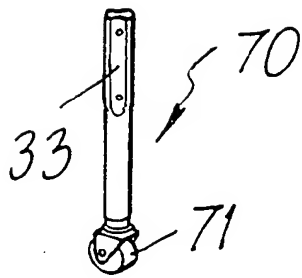


Fig. 17

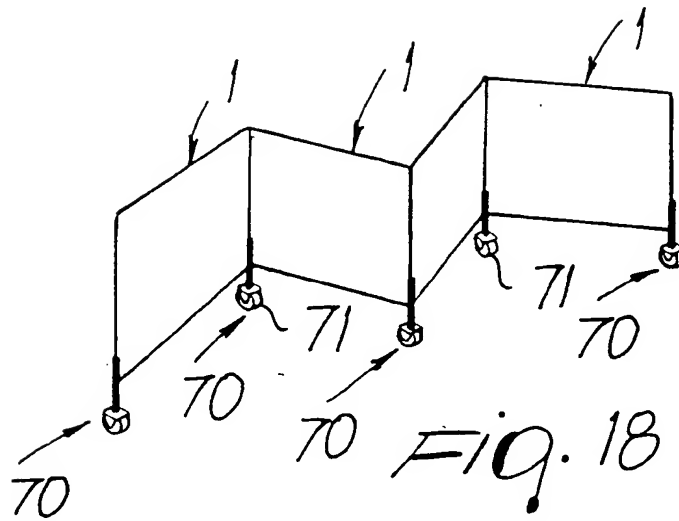


Fig. 18

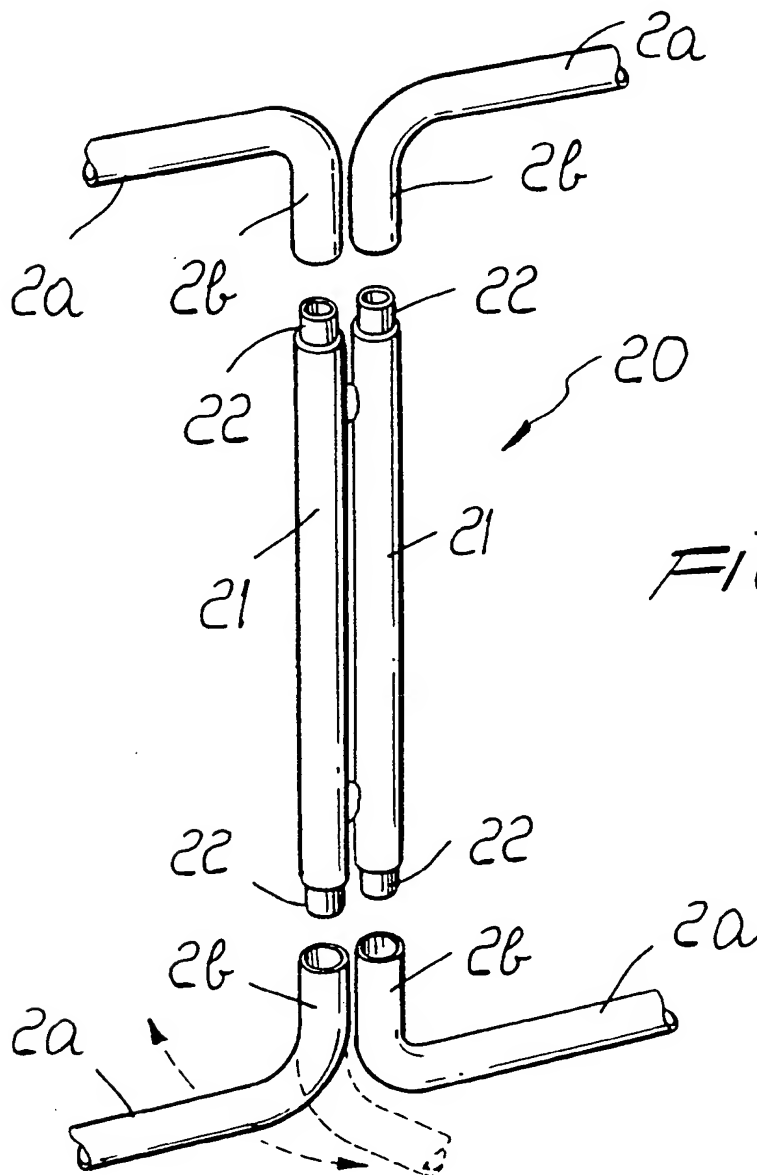
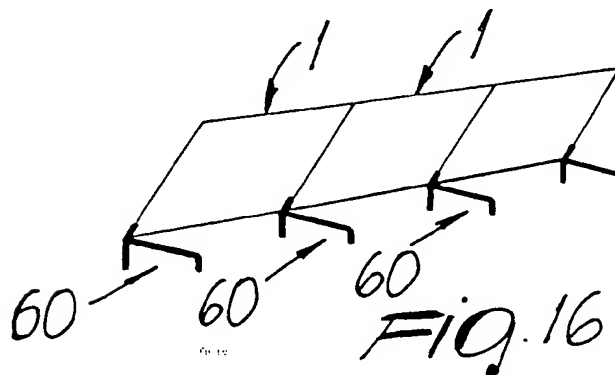
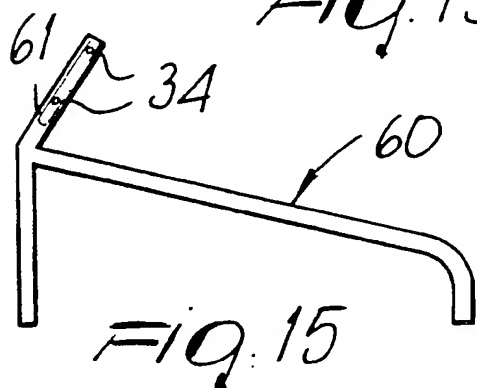
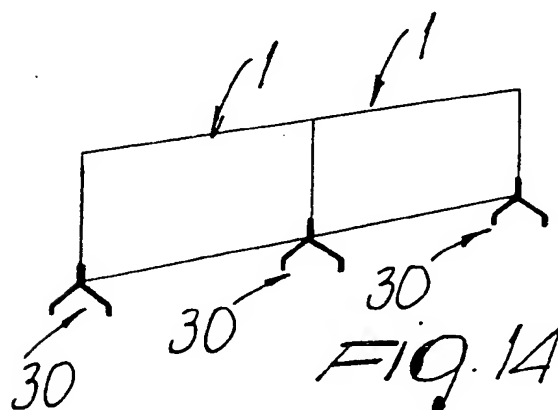
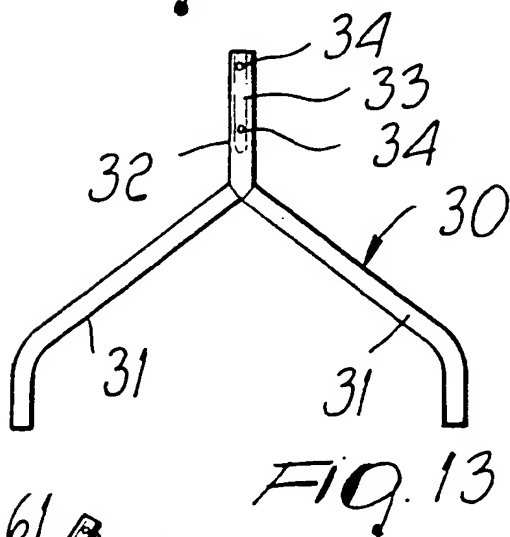
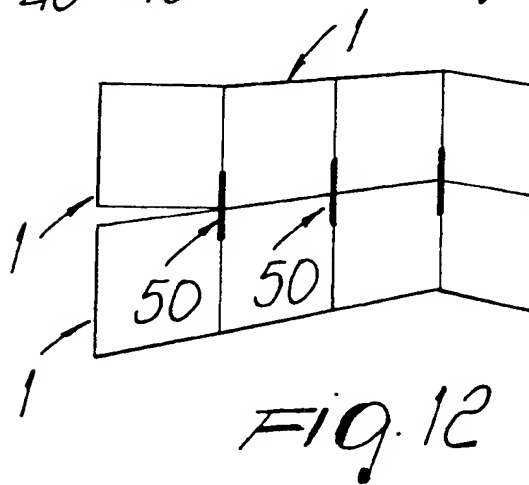
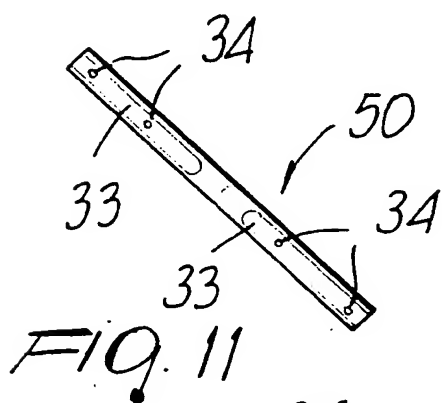
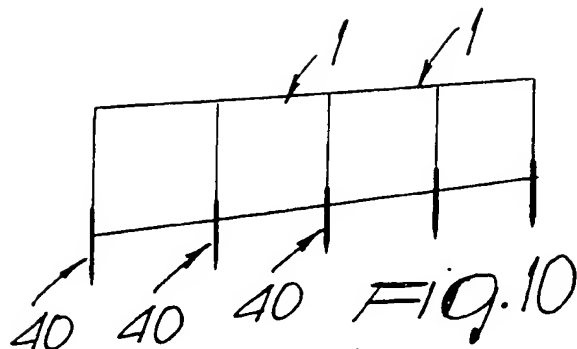
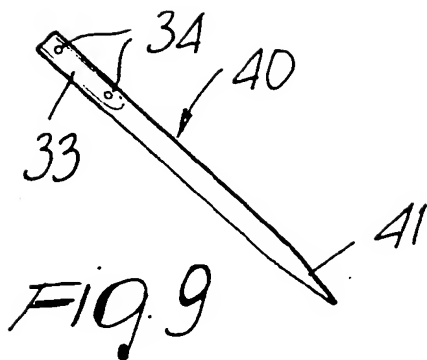
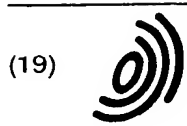


Fig. 8





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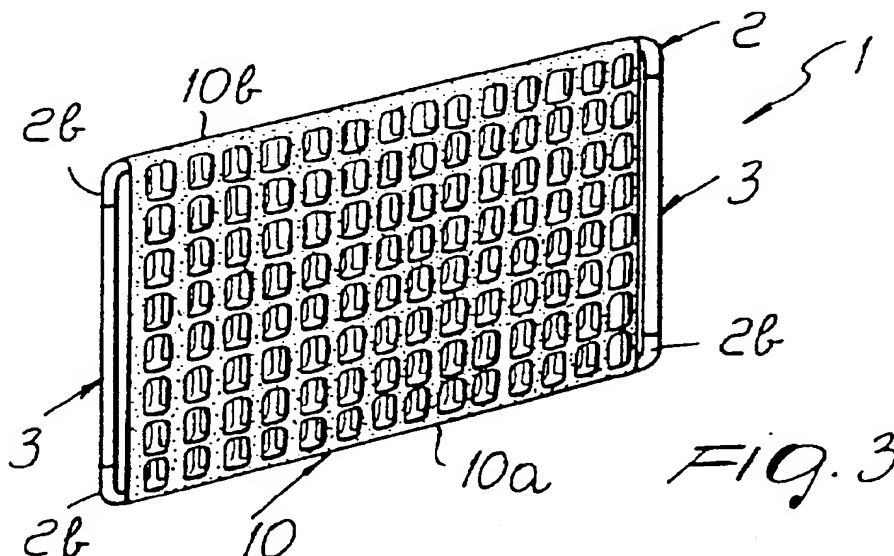
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**FIG. 3**



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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 10 2125

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 402 988 A (EISELE STANLEY R) 4 April 1995 * column 14, line 7 - line 14; figure 8 *	1,2,4,5, 7-9,13	E01F13/02
A	DE 93 13 754 U (RAGG GOTTFRIED) 25 November 1993 * page 2, paragraph 2 - page 5, paragraph 4; figures *	1,14-21	
A	DE 89 16 088 U (MÜLLER & BAUM) 29 July 1993 * figures 1,7 *	1,14	
A	EP 0 720 827 A (MATHOU MARCEL) 10 July 1996		
A	US 5 593 706 A (SPECHT PAUL) 14 January 1997		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E01F
Place of search THE HAGUE		Date of completion of the search 12 January 1999	Examiner Verveer, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 10 2125

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12-01-1999

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5402988	A	04-04-1995	NONE		
DE 9313754	U	25-11-1993	NONE		
DE 8916088	U	29-07-1993	DE	3901240 A	24-08-1989
			EP	0328752 A	23-08-1989
EP 0720827	A	10-07-1996	FR	2729187 A	12-07-1996
US 5593706	A	14-01-1997	US	5527500 A	18-06-1996
			AU	2650995 A	04-01-1996
			CA	2191839 A	14-12-1995
			EP	0781192 A	02-07-1997
			WO	9533614 A	14-12-1995
			US	5661944 A	02-09-1997
			US	5676894 A	14-10-1997